

CLAIMS

We claim:

- 1           1.       In an open system, a data health monitor for detecting and identifying non-current  
2       financial data transmitted via a communications network, comprising:  
3               a processor for receiving current financial data, formatting said current financial  
4       data to include an identifier, and transmitting said formatted current financial data onto the  
5       communications network;  
6               a status code generator for generating and transmitting a data source status code  
7       based upon the operating status of said data source, said data source status code including the  
8       data source identifier, said status code generator automatically updating said data source status  
9       code in response to changes in the operating status of said data source and automatically  
10       transmitting said updated data source status code; and  
11              a client site terminal for receiving and processing said formatted real-time financial  
12       data, said data source status code and said updated data source status code, said client site  
13       terminal selecting in real time a state or real-time display mode for said formatted real-time  
14       financial data based upon said data source identifier of said formatted real-time financial data, said  
15       data source status code and said updated data source status code, and displaying said formatted  
16       real-time financial data in accordance with the selected display mode.

### Application of Smith et al.

2. A data health monitor according to claim 1, wherein said client site terminal compares the data source identifier of said formatted real-time financial data with the data source identifier of the data source status code and displays the formatted real-time financial data in accordance with the status indicated in the data source status code when said system identifiers match.

3. A data health monitor according to claim 1, wherein said client site terminal automatically alters the display mode of said formatted real-time financial data upon receipt of an updated data source status code having a data source identifier matching that of said formatted real-time financial data in accordance with the operating status indicated in the received updated data source status code.

4. A data health monitor for detecting and identifying non-current financial data transmitted via a communications network, comprising:

a processor for receiving real-time financial data from a data source, formatting said real-time financial data to include a data source identifier, and transmitting said formatted real-time financial data onto the communications network;

a status code generator for generating and transmitting a data source status code based upon the operating status of said data source, said data source status code including the data source identifier, said status code generator automatically updating said data source status code in response to changes in the operating status of said data source and automatically transmitting said updated data source status code; and

### **Application of Smith et al.**

11           a client site terminal for receiving and processing said formatted real-time financial  
12 data, said data source status code and said updated data source status code, said client site  
13 terminal selecting in real time a stale or real-time display mode for said formatted real-time  
14 financial data based upon said data source identifier of said formatted real-time financial data, said  
15 data source status code and said updated data source status code, and displaying said formatted  
16 real-time financial data in accordance with the selected display mode.

1           5.     A data health monitor according to claim 4, wherein said client site terminal  
2 compares the data source identifier of said formatted real-time financial data with the data source  
3 identifier of the data source status code and displays the formatted real-time financial data  
4 accordance with the status indicated in the data source status code when said system identifiers  
5 match.

1           6.     A data health monitor according to claim 4, wherein said client site terminal  
2 automatically alters the display mode of said formatted real-time financial data upon receipt of an  
3 updated data source status code having a data source identifier matching that of said formatted  
4 real-time financial data in accordance with the operating status indicated in the received updated  
5 data source status code.

1           7.     A data health monitor for detecting and identifying non-current financial data  
2 transmitted via a communications network, comprising:

### Application of Smith et al.

3 a processor for receiving real-time financial data from a data source, formatting  
4 said real-time financial data to include a data source identifier, and transmitting said formatted  
5 real-time financial data onto the communications network;

6 a status code generator for generating and transmitting a data source status code  
7 based upon the operating status of said data source, said data source status code including the  
8 data source identifier, said status code generator automatically updating said data source status  
9 code in response to changes in the operating status of said data source and automatically  
10 transmitting said updated data source status code; and

11 a client site terminal for receiving and processing said formatted real-time financial  
12 data, said data source status code and said updated data source status code, said client site  
13 terminal selecting in real time a stale or real-time display mode for said formatted real-time  
14 financial data based upon said data source identifier of said formatted real-time financial data, said  
15 data source status code and said updated data source status code, and displaying said formatted  
16 real-time financial data in accordance with the selected display mode.

1 8. A data health monitor according to claim 7, wherein said client site terminal  
2 compares the data source identifier of said formatted real-time financial data with the data source  
3 identifier of the data source status code and displays the formatted real-time financial data  
4 accordance with the status indicated in the data source status code when said system identifiers  
5 match.

**Application of Smith et al.**

1           9.     A data health monitor according to claim 7, wherein said client site terminal  
2 automatically alters the display mode of said formatted real-time financial data upon receipt of an  
3 updated data source status code having a data source identifier matching that of said formatted  
4 real-time financial data in accordance with the operating status indicated in the received updated  
5 data source status code.

1           10.    A data health monitor for detecting and identifying non-current financial data  
2 transmitted via a communications network, comprising:

3                a processor for receiving real-time financial data from a data source, formatting  
4 said real-time financial data to include a system identifier, and transmitting said formatted real-  
5 time financial data onto the communications network;

6                a heartbeat signal generator for generating and transmitting at a predetermined  
7 interval a heartbeat signal including said system identifier; and

8                a client site terminal for receiving and processing said formatted real-time financial  
9 data and said heartbeat signal, said client site terminal selecting in real time a stale or real-time  
10 display mode for said formatted real-time financial data based upon said system identifier of said  
11 formatted real-time financial data and said heartbeat signal and displaying said formatted real-time  
12 financial data in accordance with the selected display mode.

1           11.    A data health monitor according to claim 10, wherein, when said client site  
2 terminal does not receive said heartbeat signal within a predetermined period of time, said client  
3 site terminal compares the system identifier of said formatted real-time financial data with the

## Application of Smith et al.

4 system identifier of the heartbeat signal not received and displays the formatted real-time financial  
5 data in the stale display mode when said system identifiers match.

1 12. A financial communications network including a data health monitor, comprising:

2 a plurality of data sources;

3 a plurality of data collection system, each including

4 a processor for receiving and formatting financial data received from said

5 data sources, said formatted financial data having a data field including a first data source

6 identifier identifying the data source of said formatted financial data and a first system identifier

7 identifying the data collection system formatting said formatted financial data, said processor

8 transmitting said formatted financial data;

9 a status code generator for generating and transmitting a status code

10 including a status message and a second data source identifier identifying the data source to which

11 the status message corresponds, said status code generator automatically updating said status

12 code when the operating status of a corresponding one of said plurality of data sources changes

13 and transmitting said updated status code;

14 a heartbeat signal generator for generating and periodically transmitting a

15 heartbeat signal including a second system identifier identifying the data collection system

16 generating the heartbeat signal;

17 a client site terminal, including

### Application of Smith et al.

18 a processor for receiving said formatted financial data, said heartbeat  
19 signal, said status codes and said status code updates, and extracting said first and second system  
20 identifiers and said first and second data source identifiers;

21 a first display mode selector circuit for comparing said second data source  
22 identifier from said status code with said first data source identifier from said formatted financial  
23 data and selecting a real-time or stale display-mode for displaying said financial data in accordance  
24 with the status message from said status code when said first and second data source identifiers  
25 match, said first display mode selector changing said selected display mode upon receipt of said  
26 updated status code from said data collection system in accordance with the status message from  
27 said updated status code;

28 a heartbeat detector circuit for detecting receipt of said heartbeat signals  
29 from said data collection systems and generating a control signal if a heartbeat signal is not  
30 received from a data collection system within a predetermined period of time;

31 a second display mode selector circuit responsive to the control signal from  
32 said heartbeat detector circuit for comparing said second system identifier from said non-received  
33 heartbeat signal with said first system identifier from said financial data and selecting a stale  
34 display mode for displaying said financial data when said first and second system identifiers match;  
35 and

36 a display for displaying said financial data in accordance with the selected  
37 display modes selected by said first and second display mode selector circuits; and

**Application of Smith et al.**

38 a network for enabling communication between said plurality of data sources, said  
39 plurality of data collection systems and said client site terminal.

1 13. A method of detecting and identifying non-current financial data transmitted  
2 through a communications network, comprising the steps of:

3 receiving financial data from a data source at a data collection system;

4 formatting the financial data received from the data source to include a data source  
5 identifier corresponding to the data source;

6 generating a data source status signal including the data source identifier, said data source  
7 status signal determined by operation of said data source;

8 transmitting the formatted financial data and the data source status signal;

9 receiving the requested financial data and the data source status signal at a client site  
10 terminal;

11 extracting the data source identifier from the received real-time financial data;

12 comparing the extracted data source identifier with stored status data to select a real-time  
13 display mode or stale display mode for said received financial data, said stored status data being  
14 derived from the data source status signal; and

15 displaying the received financial data in accordance with the selected display mode.

1 14. A method of detecting and identifying non-current financial data transmitted  
2 through a communications network, comprising the steps of:



### Application of Smith et al.

3 receiving financial data from a data source at a data collection system;  
4 formatting the financial data received from the data source to include a system identifier  
5 corresponding to the data collection system;  
6 generating a heartbeat signal including the system identifier;  
7 transmitting the formatted financial data to one or more client site terminals upon  
8 receiving corresponding requests from the client site terminals;  
9 transmitting the heartbeat signal at a predetermined interval to the one or more client site  
10 terminals;  
11 receiving the requested financial data and the heartbeat signal at the client site terminal;  
12 extracting the system identifier from the received financial data;  
13 comparing the extracted system identifier with stored status data to select a real-time or  
14 stale display mode for said received financial data, said stored status data being based upon  
15 whether the client site terminal has received the heartbeat signal within a predetermined period of  
16 time; and  
17 displaying the real-time financial data in accordance with the selected display mode.

1 15. A process of alerting a user to the existence of non-current information including  
2 the steps of:  
3 receiving, at a user's computer, information from a remote source;  
4 receiving, at said user's computer, data which describes the information as being real-time  
5 or not real-time;

**Application of Smith et al.**

- 6        porting the information to an application at said user's computer;
- 7        monitoring the data at said user's computer;
- 8        indicating the status of the information as being real-time or not real-time in said
- 9        application at said user's computer.